

CUSTOMER NO.: 38107

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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|-----------------------------|---|----------------------|
| In re application of |) | Examiner: J. SHIPMAN |
| VAN DEN BRINK, et al. |) | |
| |) | Art Unit: 2859 |
| Serial No.: 10/518,983 |) | |
| |) | Confirmation: 7054 |
| Filed: December 21, 2004 |) | |
| |) | |
| For: MRI APPARATUS AND |) | |
| METHOD |) | |
| |) | |
| Date of Last Office Action: |) | |
| April 21, 2006 |) | |
| |) | |
| Attorney Docket No.: |) | Cleveland, OH 44114 |
| PHNL020538US/ PKRZ 2 01094 |) | August 10, 2006 |

37 CFR 1.131 AFFIDAVIT

Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

The purpose of this Affidavit is to swear behind US Patent No. 6,870,368 (Visser, et al.). It may be noted that the applicant on the present application is one of the inventors on the Visser patent.

The Visser patent has an effective filing date of February 5, 2002. The present application entered the US national stage in December 2003, based on PCT Application WO 2004/001435 which was filed June 11, 2003 claiming priority to European Application No. EP 2002/0077474.1 filed June 21, 2002. Thus, the present application has an effective US filing date of June 21, 2002, the filing date of the earliest priority application.

CERTIFICATE OF ELECTRONIC TRANSMISSION

I certify that this 37 CFR 1.131 AFFIDAVIT and accompanying documents in connection with U.S. Serial No. 10/518,983 are being filed on the date indicated below by electronic transmission with the United States Patent and Trademark Office via the electronic filing system (EFS-Web).

August 28, 2006
Date

Patricia A. Heim
Patricia A. Heim

The present affidavit will show conception of the claimed subject matter of the present application prior to February 5, 2002 and due diligence from February 5, 2002 to the June 21, 2002 filing date and constructive reduction to practice.

The inventor conceived of the presently claimed subject matter prior to February 5, 2002 as evidenced by the attached Invention Disclosure (Exhibit A). This Invention Disclosure, it is apparent, supports all of the pending claims in the present application. The dates on Exhibit A have been partially blacked out.

The Invention Disclosure was prepared and submitted to the Assignee's patent department prior to February 5, 2002, which assigned it Invention Disclosure No. ID 607740. ID 607740 was reviewed at the regularly scheduled Patent Committee meeting, which approved preparation of the present application and, in accordance with company policy, set a six-month period within which the filing was to be completed.

The invention disclosure was sent for a novelty search. When the results of the novelty search were received, the search results were reviewed.

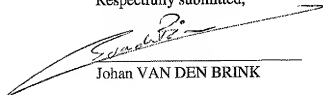
The patent agent/attorney who drafted the present application contacted the undersigned inventor to discuss the invention disclosure. Based on the ID and these discussions, the patent agent/attorney prepared a draft application which was reviewed and revised by the inventor. The review and revision process culminated in the filing of priority application EP 2002/0077474.1 on June 21, 2002.

At all times from February 5, 2002 through the June 21, 2002 constructive reduction to practice, the inventor was duly diligent.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Signed at Best The Netherlands on this 10th day of
August, 2006.

Respectfully submitted,



Johan VAN DEN BRINK

| | | | | |
|--|--|---|--|---------------------------------|
| Names and first names of the inventors. J.S. van den Brink | Sal. nr./ empl. nr. 39120406 | Building/Place/Tel. QR/0356/64863 / / / / / / / / | Ref.no. 635 Business Unit AMS-MR Dept. Head/Group Leader To Experiment Patent coordinator/Contact person M. van den Brink | Date: [redacted] - 01 |
| To be filled in by Corporate Intellectual Property PE: XXXXXXXXXX M. WOLFS | | Date: [redacted] 2001 | ID-number ID no. 604166 10 = to be filed 20 = rejected 40 = to be published | |
| Title of the invention Magnetic Resonance Receiver Coil Topology Optimisation for SENSE | | | | |

Summary of the invention: Please attach a description in English.

In a Magnetic Resonance Device where the number of receive paths (channels) is less than the number of elements in a multi-element receive coil, optimal combination topologies and strategies are proposed

Description of the invention on annexes; please describe preferred embodiments and their advantages over prior solutions in detail; please include drawings.

Stage and importance of the invention

a. Stage of the invention?

- ☐ Research ☐ Pre-development
☒ Development ☐ (trial) manufacture
Magnetic Resonance Imaging

b. In what products, processes or systems could the invention be used?

none

c. For which other business units of Philips could the invention have relevance?

GE, Siemens, Toshiba, MRI Devices, MAI

d. For which competitors of Philips could the invention have relevance? Why?

Distribution of information concerning the invention

When, how and where will information concerning the invention be distributed outside Philips? Please consider publications, hearings, exhibitions, offers, contacts with potential customers or suppliers, issuing of samples.

It has been communicated with Dave Molyneaux from MRI Devices under Non-Disclosure Agreement during his visit to Best for an investigation of potential OEM relationship.

B. Even after sending this Invention Disclosure to Philips Corporate Intellectual Property, any such acts will impair patentability of the invention. Please contact Philips Corporate Intellectual Property before information concerning the invention leaves Philips.

Supplemental information concerning the invention

a. Is the invention the result of a cooperation with persons outside Philips?

If so, with whom?

yes (I got the idea while looking at the MRI Devices coil's image quality, and suggested a solution)
Dave Molyneaux (MRI Devices)
not foreseen yet

b. Is there, or will there be, an internal report on the invention? If so, please state the number.

c. Are there, or will there be, other invention disclosures relating to this invention?

If so, please state Ref.no.

yes

d. Are there other persons who could give information on the invention?

If so, who?

ID 604166

yes (?)

Paul Harvey

Recommendation management / patent coordinator as to urgency, commercial importance, and competitors' activities.

on list. [signature]

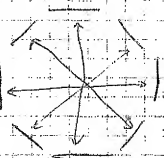
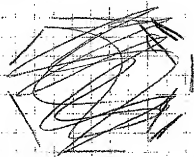


PHILIPS

onderwerp: SENSE coil optimal array configuration

This idea relates to ID 604166

It has been triggered by a contact with MRI Devices on their SENSE head coil. They have an 8-element head coil, which 8 elements are mapped to 4 channels by combining the opposite elements, i.e.



This combination is very non-optimal for SENSE, as points in space that have to be unfolded when applying the SENSE reduction are encoded in one single channel.

For our current system, the 8 elements should be mapped into 6 channels. The insight (partially covered by

ID 604166) is that one should have as much individuality as possible along the preferred, ~~or~~ actual SENSE reduction direction(s). This is first specialized here, and also general:

For brain imaging the SENSE reduction directions are most left-to-right ~~or~~ anterior-to-posterior.
LR AP

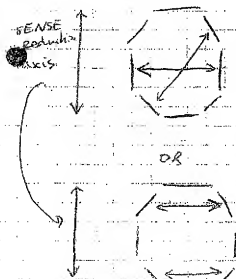
One possibility for mapping 8-to-6 for the configuration of 8 elements around the head would be to combine the oblique one



and to keep optimal individuality along the AP and LR axes

Onderwerp: SENSE coil optimized array configuration

II) The second possibility would be a selection mechanism as described in 604166, where the combination is optimized depending on the actual SENSE reduction direction, e.g.



This one is asymmetric, which could be advantageous when considering phase behaviour.

This one is more symmetric. Coupling needs to be minimized within and across the residual elements. The combined elements are orthogonal to the reduction axis.

In more general terms, the individual coil array elements must be aligned as much as possible along the SENSE reduction axis. In the head, where the imaging plane is often tilted some 20° around the LR axis, the elements covering AP must be in-line with this orientation. In applications like cardiac imaging the individual elements should ^{optimally} cover the most common slice positions in the heart, like short axis, long axis and 4-chamber views and their respective fold-over, or SENSE reduction direction.

It can be envisaged to automatically measure and select the optimal